

Amendments to the Claims

This listing of claims will replace all prior versions and listings of the claims:

1. (currently amended) A method for defining attributes of polygon border tiles, comprising:
 - decomposing a polygon into a plurality of segments;
 - decomposing the segments into a plurality of border tiles;
 - designating a same single edge for each border tile;
 - determining whether the single designated edge of each border tile crosses the polygon, is within the polygon, or is outside the polygon in order to determine a spatial relationship between the designated edge of each border tile and the polygon;
~~and~~
 - generating the attributes of the border tiles based on whether only the single designated edge of each border tile crosses the polygon, is within the polygon, or is outside the polygon; and
 - storing the attributes to facilitate execution of queries.
2. (previously presented) The method of claim 1 wherein generating the attributes further comprises:
 - generating a first attribute if the single designated edge of the border tile crosses the polygon;
 - generating a second attribute if the single designated edge of the border tile is disposed completely within the polygon; and
 - generating a third attribute if the single designated edge of the border tile is disposed completely outside the polygon.
3. (original) The method of claim 2 wherein the first, second, and third attributes are different from each other.

4. (previously presented) The method of claim 1 wherein designating a same single edge for each border tile further comprises designating an eastern edge for each border tile.
5. (previously presented) The method of claim 1 wherein designating a same single edge for each border tile further comprises designating a same single edge selected from the group consisting of an eastern edge, a western edge, a northern edge, or a southern edge.
6. (previously presented) The method of claim 1 wherein the determining element further comprises determining if the single designated edge of a border tile is within an interior space of the polygon.
7. (original) The method of claim 1 further comprising:
 - designating the segments as vectors that traverse in a clockwise direction around a border of the polygon;
 - determining an attribute of a border tile based on a proximity of one of the vectors to one of the edges of a border tile and based on a direction of the one of the vectors through the border tile.
8. (original) The method of claim 1 further comprising decomposing multiple segments through a single border tile.
9. (currently amended) A computer-readable medium having computer-readable program code embodied therein for causing a computer system to perform:
 - defining a polygon having a border that is non-self-intersecting and formed of a plurality of segments on a grid of tiles;
 - defining, from the grid of tiles, a plurality of border tiles that intersect the segments;~~and~~
 - generating an attribute associated with a same single edge for each of the plurality of border tiles, wherein the attribute is based on whether only the same

single edge of each border tile crosses the polygon, is within the polygon, or is outside the polygon; and

building an index for spatial objects with the attribute.

10. (original) The computer-readable medium of claim 9 wherein the attribute can be modified on at least two different occasions for the same border tile.

11. (original) The computer-readable medium of claim 9 wherein the attribute is set to a first condition and then re-evaluated and set to a second condition if multiple segments pass through the same border tile.

12. (original) The computer-readable medium of claim 9 wherein the attribute is associated with an eastern edge of the border tile.

13. (original) The computer-readable medium of claim 9 having computer-readable program code embodied therein for causing the computer system to further perform converting the polygon to a non-self-intersecting chain-code wherein at least one segment passes twice through the same border tile.

14. (original) The computer-readable medium of claim 9 having computer-readable program code embodied therein for causing the computer system to further perform:

defining a y-axis through a border tile;

generating an attribute based on a proximity of a segment through the y-axis.

15. (original) The computer-readable medium of claim 14 wherein generating an attribute further comprises comparing proximities of two different segments through the y-axis.

16. (currently amended) A computer system comprising:

a processor; and

memory having computer readable code executable by the processor for:
decomposing a polygon into plural segments on a grid of tiles;
identifying a same single edge for each of plural border tiles, each of the
border tiles intersecting at least one of the segments; and

identifying a spatial relationship between each of the single edges and the
polygon to define an attribute of the plural border tiles with respect to the polygon,
the attribute being based on whether only the single edge of each border tile is one of
crossing the polygon, being within the polygon, and being outside the polygon and
a display for displaying query results for the attribute of the polygon.

17. (original) The computer system of claim 16 wherein the plural segments are non-
self-intersecting.

18. (previously presented) The computer system of claim 16 further comprising
computer readable code executable by the processor for identifying a spatial
relationship between a direction of at least one segment though one of the border tiles
to define an attribute of the one of the border tiles.

19. (previously presented) The computer system of claim 16 further comprising
computer readable code executable by the processor for defining a horizontal axis
through one of the border tiles and identifying a spatial relationship between at least
one segment and the horizontal axis to define an attribute.

20. (original) The method of claim 19 wherein the at least one segment crosses the
horizontal axis to generate a first attribute and does not cross the horizontal axis to
generate a second attribute different than the first attribute.